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ABSTRACT

The results of the General Revenue Sharing Data Study carried out by Stanford Research Institute for the Office of Revenue Sharing are reported in four volumes. This volume, Executive Summary, presents highlights excerpted from Volumes II, III, and IV. Emphasis is placed on those findings, conclusions, and recommendations that deserve special consideration by the Secretary of the Treasury, the Office of Revenue Sharing, the U.S. Congress, and other individuals and organizations having responsibilities for or interests in the general revenue sharing (GRS) program. Major findings of the GRS study indicate that although the GRS program appears to be satisfying many of the goals envisioned by Congress, a higher level of equity of allocations can be achieved through the use of more accurate and more current data in the computation of allocation amounts for the over 39,000 units of State and local government involved. Lack of currency in population and per capita income data is the major potential source of inequity. The year-to-year fluctuations in GRS allocations that recipient governments have so far experienced can be attributed mainly to the annual updating of adjusted taxes in the allocation formula. (Author/DN)

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AUGUST 28, 1974

# GENERAL REVENUE SHARING DATA STUDY

## VOLUME I

## *EXECUTIVE SUMMARY*

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## PREFACE

The results of the General Revenue Sharing Data Study carried out by Stanford Research Institute for the Office of Revenue Sharing (Contract Tos-21) are reported in four volumes:

- Volume I--Executive Summary.
- Volume II--Evaluation of Current and Alternative Data Plans.
- Volume III--Evaluation of Current and Alternative Data Sources.
- Volume IV--Technical Findings.

This volume, Executive Summary, presents highlights excerpted from Volumes II, III, and IV. Emphasis is placed on those findings, conclusions, and recommendations that deserve special consideration by the Secretary of the Treasury, the Office of Revenue Sharing, the U.S. Congress, and other individuals and organizations having responsibilities for or interests in, the general revenue sharing (GRS) program.

This is not an official Department of the Treasury document. The presentation, conclusions, and recommendations are the responsibility of Stanford Research Institute (SRI) and do not necessarily reflect the ideas or position of the Department of the Treasury, other agencies, or their employees.

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## HIGHLIGHTS OF THE GRS DATA STUDY

These are the principal findings of the GRS Data Study. Following each one is an indication of where more detailed discussions can be found. Readers are urged to study the detailed discussions, as they provide the rationale for the findings highlighted here.

- Although the GRS program appears to be satisfying many of the goals envisioned by Congress, a higher level of equity of allocations can be achieved through the use of more accurate and more current data in the computation of allocation amounts for the over 39,000 units of State and local government. (See Volume I–Section II, Volume II–Section IV, Volume IV–Sections V and VI for more information.)

- Lack of currency in population and per capita income data is the major potential source of inequity since the true situation has a propensity to change rapidly from year to year and these two elements have not been updated since the program began. (See Volume I–Section II, Volume II–Section III, and Volume IV–Sections V and VI for more information.)

- The year-to-year fluctuations in GRS allocations that recipient governments have so far experienced can be attributed mainly to the annual updating of adjusted taxes in the allocation formula, to keep pace with changing taxation patterns. Fluctuations are inherent in the GRS allocation procedure and will result whenever data are updated. (See Volume I–Section II, Volume II–Section III, and Volume IV–Section V for more information.)

- Although equity of allocations will be increased by updating those population and per capita income data elements that are taken from the 1970 Census, when the timely data are used for the first time in GRS computations, the change in allocation will be significant for many recipients. (See Volume I–Section II, Volume II–Section IV, and Volume IV–Section V for more information.)

- Equity of allocations to the 50 States and the District of Columbia can be increased by adjusting at the state level for underenumeration, using the national age/sex/race underenumeration rates prepared by the Bureau of the Census. If the national rates are used to adjust for underenumeration at the county-area and local government levels, equity of allocations is likely to increase for larger jurisdictions and to decrease for many smaller

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jurisdictions. (See Volume I–Section III, Volume II–Section IV, and Volume III–Appendix D for more information.)

- Improvements in data quality are needed for the population of Indian tribes and Alaskan native villages; failing a complete enumeration, the recommended technique to improve these data is the one under development by the Bureau of Indian Affairs and under analysis by the Bureau of the Census. (See Volume I–Section II, Volume II–Section IV, and Volume III–Appendix F for more information.)

- Because of the complex and interactive nature of the GRS allocation procedure, individual improvements to individual data elements may contribute to inequity of allocations; updating county-area population without also updating population for the local governments in the county, for example, will cause inequity of allocations. (See Volume II–Sections III and IV and Volume IV–Sections IV and V for more information.)

- If the population and per capita income model currently under development and test by the Bureau of the Census fulfills its promise, use of these data for Entitlement Periods 6 and 7 will increase the equity of allocations. (See Volume I–Section III, Volume II–Section IV, and Volume III–Appendix A for more information.)

- Although the 1970 Census procedures produced data that were quite adequate for the general statistical purposes for which they were intended, 1970 Census data for the 27,000 local governments under 2,500 population–especially per capita income data where a 20-percent sample was used–are not suitable for GRS purposes. The problem of updating data for 39,000 units of government is especially severe. (See Volume I–Section II and Volume II–Section III for more information.)

- Longer range improvements to data quality required: (1) better intercensal estimating techniques for updating between censuses and better postcensal adjustment techniques for reducing the effects of underenumeration and underreporting, (2) mid-decade censuses (especially for small areas), (3) the development of valid indicators of need that are more compatible with the acquisition of reliable data, (4) increased reliance on nationwide and Statewide data standards and systems. (See Volume I–Section III and Volume II–Sections IV and V for more information.)

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The GRS Data Study could not have been completed in the 20 weeks allotted without the cooperation, understanding, and dedication of many organizations and individuals. Special appreciation is due to Graham Watt, Director of the Office of Revenue Sharing, and John K. Parker, Deputy Director and ORS Project Officer for the study, who not only provided valuable guidance to the project team but encouraged continual interchange between the team members and other individuals whose contributions were essential to the project.

SRI wishes to express thanks to the critical review panel who met biweekly with project management to discuss and resolve issues. The panel included Dr. Michael D. Bird of the U.S. Congressional Joint Committee on Internal Revenue Taxation; Dr. Joseph Duncan, Deputy Associate Director for Statistical Policy at the Office of Management and Budget; Robert Hagan, Deputy Director of the Bureau of the Census; and Thomas Denomme of the Government Accounting Office.

Marshall Turner and Henry Husmann of the Bureau of the Census provided invaluable assistance to the project team in scheduling interviews, obtaining data, and coordinating the review of study results.

The members of the Advisory Board established by SRI, who met three times during the course of study to discuss issues of concern to the study, also deserve much credit. The Board was composed of representatives from the NAACP, National Urban League, National League of Cities, National Legislative Conference, U.S. Conference of Mayors, International City Management Association, National Association of Counties, National Governors' Conference, and the Council of State Governments.

The GRS Data Study was carried out under the direction of Reese C. Wilson of SRI and the technical direction of E. Francis Bowditch, Jr., of Technology Management Incorporated. Harvey Dixon, Executive Director of the Urban and Social Systems Division of SRI, had overall management responsibility for the study. Steven Waldhorn of SRI coordinated the activities of the Advisory Board. Three subcontractors, in addition to TMI, were employed--the Center of the Continuing Study of the California

Economy, Human Resources Corporation, and Westat, Incorporated. SRI technical group leaders were William Grindley, Norman McEachron, and Dr. Richard Davis. Other key project personnel and their affiliations were:

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John Yates

The dedication of the project team enabled the demanding schedules to be satisfied.

A large number of individuals were contacted in the course of the study. Their contributions were vital. A list of all persons contacted during the study is included as Appendix A.

# I INTRODUCTION

The State and Local Fiscal Assistance Act of 1972 (Public Law 92-512) established the system known as General Revenue Sharing (GRS) to redistribute a portion of Federal revenues from individual income taxes to State and local governments according to a number of complex formulas specified in the Act. The GRS program will distribute $30.2 billion to over 39,000 units of State and general-purpose local government between January 1972 and December 1976. The amount allocated to each recipient is dependent on indicators of size, need, and own efforts to satisfy need. The GRS allocation procedure has succeeded generally in providing entitlements that are proportionate to these indicators; i.e., proportionate to each recipient's population, to the inverse of per capita income, and to the recipient's tax effort. The per capita allocation is usually larger for jurisdictions having greater need and attempting to meet that need by a strong tax effort. Thus, the GRS program appears to be fulfilling many of the goals envisioned by Congress.

However, the data specified in the Act for use in the allocation formulas are obtained from several sources, do not all reflect the same time period or reference data, and do not reflect some real world situations adequately. Because of the complexity of the allocation formulas, it is not easy to see what effect, if any, particular defects in data quality might have, or to determine appropriate ways of improving the equity of allocations where a problem exists.

The Act itself gives the Secretary of the Treasury discretion as to the use of alternative data sources to provide more current or more comprehensive data to improve equity. The Office of Revenue Sharing (ORS)

therefore engaged SRI to carry out a comprehensive data study with the following objectives:

- To determine the relative effects of the equity of revenue sharing allocations of the varying degrees of currency, comprehensiveness, and accuracy of each of the data elements used in the allocation formulas.
- To determine the degree of inequity that would result in each of the next five years if present data sources were to be used, and the resulting impact on States and local jurisdictions that have significantly different characteristics.
- To identify alternative sources of data for each of those data elements which, if present sources were to be used, would result in significant inequity of allocations.
- To prepare and document a set of alternative data plans, conduct cost and benefit analyses of each, and make recommendations as to which plan should be followed.

SRI's mission was solely to carry out the GRS Data Study, not to study the effects of revenue-sharing on communities, nor to evaluate the operations of ORS.

This is the first volume of the four-volume report describing the results of the GRS Data Study carried out by SRI between April 12, 1974 and August 28, 1974. It presents, for the general reader in Federal, State or local government, the main findings, conclusions, and recommendations developed during the 20 weeks allotted to the study. Volume II, Evaluation of Current and Alternative Data Plans, presents a more detailed examination of the findings, conclusions, and recommendations as they pertain to the analysis and selection of GRS data strategies. Volume III, Evaluation of Current and Alternative Data Sources, contains a catalog of the various sources of data and data series that are used or have been considered for use in the GRS allocation process, and professional evaluations of the quality of data that could be expected from each source. Volume IV, Technical Findings, presents the results of data change, sensitivity, and impact analyses that were undertaken to support study objectives.

The GRS Data Study was completed by a joint project team composed of staff from Stanford Research Institute and from its subcontractors: Technology Management Incorporated, Center for the Continuing Study of the California Economy, Human Resources Corporation, and Westat Incorporated. The study was directed by Reese C. Wilson of SRI; E. Francis Bowditch, Jr., of TMI served as technical director.

## II MAJOR FINDINGS AND CONCLUSIONS

The level of operational and systems effectiveness achieved to date by the Office of Revenue Sharing and the Bureau of the Census in response to the Act is commendable in itself, but even more so considering the briefness of the period allowed for ORS to make the system operational. The preparation and distribution of quarterly revenue sharing payments based on data that describe important demographic, economic, and taxation indicators for each of about 39,000 jurisdictions is unprecedented. The GRS Data Study, however, has confirmed that increased equity of allocations can be achieved through the acquisition, development, and use of more accurate and more current data.

### Factors Affecting Equity of Allocations

The Secretary of the Treasury is responsible for ensuring that GRS allocations made in accordance with the Act are equitable. The complexity of the allocation formulas, combined with the fact that the data required for the formulas are obtained from several sources, at varying times, at differing costs, and with only partially determined accuracy make it difficult to determine equity. A number of factors were considered to (1) determine the relative effects on equity of varying degrees of currency, comprehensiveness, and accuracy of the data elements used; (2) determine what inequities would result in the next 5 years if present data sources continued to be used; (3) identify alternative data sources that might improve allocation equity; and (4) recommend alternative data plans.

The quality of the data employed under the present data plan was evaluated to identify any data deficiencies. The propensity of the real

values of these data elements to change over the next few years was analyzed. The sensitivity of allocation amounts to data errors or changes was established to identify those data elements having the greatest effect on equity of allocations. Finally, the use of alternative data sources was examined in the context of achieving the highest level of equity of allocations commensurate with available resources and time.

## The Concept of Equity of Allocations

It can be inferred from the Act that perfectly accurate and completely timely demographic, economic, and taxation data for each of the 39,000 State and local jurisdictions would achieve the highest degree of equity of allocations. In practice, it is impossible to collect and maintain data that are errorless and that reflect change. Any data strategy for revenue sharing, including the one now in use, strives to keep data collection errors at a manageable level and to update the data periodically in order to keep up with changing situations. The major concept of equity adopted for the GRS Data Study is based on the acquisition, development, and use of reasonably accurate and reasonably current data. If data of high quality are used to calculate allocation amounts, the highest practicable degree of equity of allocations will have been achieved.

Data that accurately reflect changes in the demographic, economic, or taxation indicators, although allowing data-based equity of allocations, can cause fluctuations in year-to-year allocations to GRS recipients. The Act bypasses the normal annual appropriation process and sets aside a specific amount of each of the five years of the program. These amounts increase about 2.5 percent per year, much less than inflationary trends. These facts, coupled with a review of the legislative history, suggest that Congress expected comparatively little variation in allocations to recipient governments from one year to another. Predictable allocation amounts were thought to be important to the

planning process of recipient governments. Thus, fluctuations in year-to-year allocations that exceed some percentage, say 10 percent or so, could begin to undermine this goal of the GRS program.

The GRS data study has found that there is rapid and significant change from year to year in the taxation patterns and relative demographic and economic characteristics of general-purpose governments throughout the country. Because these changes do take place, whenever the Office of Revenue Sharing updates the data used to allocate GRS funds, it causes fluctuations which greatly exceed the 2.5 percent annual increase in the total funds available. Also, since the total amount is fixed, and the allocation process divides the funds among competing governments based on their taxation, economic, and demographic data, for every recipient receiving a large increase in its allocation as compared with the previous year, there are usually several recipients whose allocations decrease somewhat from the prior period (often significantly). The introduction of new data in the operation of the program inherently causes large fluctuations in the allocations to recipient governments, not because the original data were wrong, but because the real world changes over time.

The GRS Data Study shows clearly that, if accurate and timely data are used in the future, the fluctuations will continue. According to the Act, if perfectly accurate and completely timely estimates of each data element were available for every one of the 39,000 recipient governments, the Office of Revenue Sharing would be obligated to use the data, although fluctuations in year-to-year allocations might reach a magnitude even greater than those experienced to date. Therefore, the working concept developed by SRI to guide the analysis of alternative data plans is this: new data, which will cause fluctuation of allocations, should be introduced only when ORS is certain that the introduction of such data will result in a marked improvement in the quality of the data, and therefore, the equity of the resulting allocations.

Data Elements Used to Compute Allocations

The Act states that the data used in determining allocations and entitlements shall be the most recently available data provided by the Bureau of the Census or the Department of Commerce, as the case may be. Demographic, economic, and government taxation data are used to calculate allocations to the 39,000 State and local jurisdictions. Three major indicators are used:

- The major indicator of size is population. Population shall be determined on the same basis as resident population is determined by the Bureau of the Census for general statistical purposes. The data used in EP 5 (fiscal year 1974-75) have a reference date of July 1, 1973 at the State level; the substate data are from the 1970 Census.
- The major indicator of need is per capita income. Income means total money income received from all sources, as determined by the Bureau of the Census for general statistical purposes. The data used in EP 5 are from the 1970 Census, and reflect 1969 money income.
- The major indicator of effort to satisfy need is adjusted taxes. The adjusted taxes of any unit of local government are the compulsory contributions expected by such government for public purposes, as such contributions are determined by the Bureau of the Census for general statistical purposes (adjusted to exclude expenses for education). EP 5 data are for fiscal year 1972-73.
- Other data elements used to compute allocations include:
  - Personal Income--Personal income means the income of individuals, as determined by the Department of Commerce for national income accounts purposes. EP 5 data are for calendar year 1971.
  - State and Local Taxes--The net amount collected from the State and local taxes of such State--as such contributions are determined by the Bureau of the Census for general statistical purposes. EP 5 data are for fiscal year 1971-72.
  - Urbanized Population--Urbanized population means the population of any area consisting of a central city or cities of 50,000 or more inhabitants--which is treated as an urbanized area by the Bureau of the Census for

general statistical purposes. EP 5 data are from the 1970 Census, as adjusted for the 1973 definitions.

- State Individual Income Tax--The individual income tax of any State is the tax imposed upon the income of individuals by the State and described as a State income tax in the Internal Revenue Code of 1954. EP 5 data are for calendar year 1973.
- Federal Individual Income Tax Liabilities--Federal individual income tax liabilities attributed to any State for any period shall be determined on the same basis as such liabilities are determined for that period by the Internal Revenue Service for general statistical purposes. EP 5 data are for calendar year 1972.
- Intergovernmental Transfers--The intergovernmental transfers of revenue to any government are the amounts of revenue received by that government from other governments as a share in financing (or as reimbursement for) the performance of governmental functions, as determined by the Bureau of the Census for general statistical purposes. EP 5 data are for fiscal year 1972-73.

Where the Secretary determines that the data are not current or are not comprehensive enough to provide for equitable allocations, he may use such additional data (including estimates) as he may provide for in Treasury regulations. Both the accuracy and currency of many of the data elements employed under the present data plan need improvement. The major problem is lack of currency (timeliness) especially for those data elements that have not been updated significantly since the 1970 Census--population and per capita income at all levels (urbanized population at the State-area level--not total population which is now updated annually).

Many of the problems associated with the lack of accuracy and currency of the data for population and per capita income evaluated in the GRS Data Study stem from the fact that, before 1972, all had been collected for other purposes. Neither the Bureau of the Census nor the Bureau of Economic Analysis--nor any other Federal or State statistical agency--has ever collected demographic, economic, or taxation data specifically to be used in an interactive, competitive formula that allocated

public funds to a large number of recipients. No agency has ever had the mission of collecting absolutely timely, fully comprehensive, and completely accurate data. As an example, the Bureau of the Census had never published, did not intend to publish, and did not intend to use (except in aggregates) the income data for units of government below 2,500 in population. Yet the Act specifies income data to be used to calculate payments to these governments, even though the defects in the data are likely to have an inequitable effect on the allocations. Data that are completely adequate for general statistical and national accounts purposes are not always completely adequate for revenue sharing purposes.

## The GRS Allocation Procedure

In order to assess the importance of any data deficiencies on the equity of allocations, it is necessary to analyze the sensitivity of allocation amounts to errors in the data elements, both individually and in combination with one another. The revenue sharing funds are allocated among the 39,000 units of government by the Office of Revenue Sharing in the following way:*

- State-area allocation process--The amount authorized for an entitlement period is allocated among the 51 States (including the District of Columbia) in accordance with the three-factor Senate formula (population, relative income, and general tax effort) and the five-factor House of Representatives formula (the three Senate factors plus State urbanized population and income tax collections). The higher of the two amounts is selected for each State and adjustments are made to ensure that the total equals the appropriated amount and to calculate special noncontiguous-State allowances for Alaska and Hawaii. One-third of the allocation computed for each State area goes to the State government and two-thirds is apportioned to county-areas within each State.
- County-area allocation process--The State amount for local governments is distributed to county-areas based on the three-factor formula (population, relative income, and general tax effort). Adjustments are made to ensure that the

*The reader is referred to Volume IV, Technical Findings, for a mathematically rigorous treatment of the subject.

per capita allocation to any county/area does not exceed 145 percent or fall below 20 percent of the per capita entitlement for all units of local government within the State. The resulting surplus or deficit is shared by all the remaining--"unconstrained"--county-areas within the State.

- Local-government allocation process--Each county-area allocation is subdivided into separate amounts for Indian tribes and Alaskan native villages (based on population), the county government (based on adjusted taxes), townships (based on adjusted taxes), and all other units of government. Townships and other local governments are then allocated funds separately on the basis of the three-factor formula (population, relative income, and general tax effort)* and the allocations are adjusted in accordance with the 145 percent and 20 percent constraints, with any resulting surplus or deficit shared by unconstrained townships, cities, and places. In addition, if any unit receives more than 50 percent of its adjusted taxes plus intergovernmental transfers, the surplus is given to the county government, and if the county government receives more than 50 percent of its taxes plus transfers, the surplus is given to the State government. This process is repeated for local governments until the amounts allocated to the State and local governments total 100 percent of the State-area entitlement.

From this description, it is apparent that units of government at each level compete (within the larger jurisdiction they are a part of) for their share of the allocation, based on population, relative income, and general tax effort. Because these demographic, economic, and taxation data affect the size of the entitlement for any jurisdiction, data quality is of great importance. The effect of data accuracy and currency on the equity of allocations cannot be directly inferred from data quality ratings alone. The propensity of data to change for each data element and the sensitivity of the allocation amounts to data errors or data change must also be examined.

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*The three-factor formula for local governments mathematically reduces to adjusted taxes divided by per capita income squared.

## Conclusions Regarding Current and Alternative Data Sources

The salient data problems and the alternatives explored as possible solutions are described here. The conclusions are based on the detailed analyses of Volume III. The task assigned to SRI was not to evaluate the agencies that produced the data, it was rather to evaluate how the data themselves met the performance specifications of one particular user, the Office of Revenue Sharing.

Of the three types of data used in the allocation formulas--demographic, economic, and taxation--population and per capita income data have definately more quality problems than tax data. This is true at the State, county, and local levels. Demographic and economic data suffer from problems of currency and accuracy which significantly deteriorate their quality. Taxation data suffer from imperfect understanding of new concepts by local governments, or from difficulties in attaining rapid and reliable responses from surveys. However, the quality of taxation data can be improved generally, through better understanding and through more technical assistance to local governments. It will be more difficult to improve the quality of the demographic and economic data. Underenumeration, in particular, will be difficult to eliminate.

### Problems with Present State-Level Data

The most serious quality problems of the present State-level data plan are errors induced by the lack of currency. Four data elements are degraded in quality by lack of currency; personal income, money income, State and local taxes, and urbanized population.

While revised personal income data as produced by the Bureau of Economic Analysis are available for 1973, the revised data are not employed by the Office of Revenue Sharing. Instead, the 1971 personal income series is employed, to conform with the fiscal year 1971-72 State

and local taxes in computing the general tax effort factor at the State-area level.

Money income, used in computing per capita income, suffers even more from lack of currency than most Census-year figures because it is based on reported 1969 incomes.

Data on State and local taxes for fiscal year 1971-72 are being employed to calculate allocations up to 36 months after those taxes were collected. Currency problems with the taxation data stem from the difficulty of obtaining returns to a sample questionnaire from special taxation districts that do not participate in the GRS allocations.

Finally, the population of a State's urbanized areas is computed only once in a decade, after intricate geographic contiguity and density tests on small-area data from the decennial census.

Regardless of whether the data are old because they are collected only once a decade for general statistical purposes, or because newer data cannot be used in the denominator if the period covered is not the same as that for the numerator, lack of currency makes the data quality lower than it should be for GRS administrative purposes.

Of the data used at the State level, the most serious accuracy problems are with money incomes and personal incomes. Money income as collected in the 1970 Census for 1969 contains unknown (but perhaps substantial) errors due to bias. Sampling variance also tends to decrease accuracy, especially at the substate level. Accuracy is also dependent on having the respondent remember his income for the prior year. Since there is no known procedure for independently testing the accuracy of personal income, the evaluations were based on estimations of the errors inherent in the method, and on the comprehensiveness of the definition.

The BEA and the Bureau of the Census have different definitions of income and collect their data in disparate ways. However, when the BEA personal income definition is disaggregated to its component parts and reconstructed to simulate the Census concept of money income, data from the two bureaus produce different results for 1969 State money income. These differences can be as high as 22 percent in places where State boundaries are crossed in commuting patterns, and average about 8 percent nationally. There is no way of firmly determining which (if either) 1969 State money income figure is the true one, nor of determining whether the true income figure lies above, below, or between the figures from the two data sources. Given the known measurement problems with both data series, it is probably safe to conclude that neither provides true State money income.

The only known accuracy problems with taxation data at the State-area level occur in State and local taxes and in State individual income taxes. The magnitude and the seriousness of the measurement error in State and local taxes are unknown, but much of the error probably derives from sampling-based problems, as well as from the difficulty jurisdictions too small to employ experts have in understanding the Bureau of the Census forms. Although the FY 1974 data for local units of general purpose government will represent complete coverage by the GRS Survey, the Act's concept of adjusted taxes and disagreement over what constitutes intergovernmental transfers are likely to result in measurement errors.

## Alternative State-Level Data Sources

Several alternative data sources for State-level data elements were evaluated. Although the work of the Bureau of the Census that incorporates Internal Revenue Service data is in progress (the Administrative Records Program), and will produce State population data by the end of 1974, the P-25 series now in use is both reliable and available. Unless

the Bureau of the Census amends the P-25 Series, or demonstrates that the new series will produce increased accuracy, the currency and accuracy of the present State population data are the best ORS can attain. Under-enumeration, the largest single source of measurement error, should be accounted for as described later.

There are no alternative data sources for urbanized population. Although several suggestions have been explored, such as using disaggregated Standard Metropolitan Statistical Area (SMSA) data, or using the anticipated Census/IRS estimates of local government population, no alternative could provide data that would satisfy the multiple definitional demands of place size, density, contiguous area, and relation to an urban core.

There is no alternative source for State and local taxes. While the accuracy of this data element is viewed as very good, it suffers from a lack of currency. The Bureau of the Census could either lower the number of responses required from the Survey conducted to develop the data, increase the intensity of follow-up procedures, or do both, in order to meet the ORS Data Improvement Program deadlines. Meeting the deadline could improve the timeliness of this data element materially.

If the timeliness of State and local taxes data could be improved, then more recent BEA personal income data could be used with the taxes to calculate the tax effort factor. More-timely income data are readily available.

Either the BEA or the Bureau of the Census personal income series would improve the currency of per capita income since the provisional estimates for 1974 could be ready for EP 6 (Fiscal Year 1975). If nothing more recent than final estimates for 1973 were available for EP 6, they would still provide a 3-year improvement in currency. Whether the Bureau of the Census uses the BEA data to compute their own version of 1974 or 1973

money income, or whether ORS uses the BEA reconstructions directly, use of BEA-based data in EP 6 would improve the quality of the data element.

## Problems with Present County-Area Data

As with data at the State level, currency problems of demographic and economic data are the most serious threats to data quality at the county-area level. However, serious problems also occur at the county-area level with the accuracy of money income data used to compute both per capita income and aggregate money income.

Money income at the county-area level is for calendar year 1969 and is subject to all the bias and measurement errors discussed in the problems of present State-level money income figures. Since these data are used twice, their currency and accuracy should be considerably higher than those of the present source.

Adjusted taxes and intergovernmental transfers, those compulsory contributions net of taxes attributable to education expenses, are available within 8 months of the end of the fiscal year they report. Their currency is rated as excellent, but their accuracy is probably less. Because of the problems associated with the newness of the concept and the differences of opinion or lack of sophistication of some controllers, there is considerable room for potential error, especially for counties and local units with small populations. This situation demands attention and some form of assistance to help controllers understand what the Act meant by their adjusted taxes and intergovernmental transfers, and what items are admissible.

## Alternative County-Area Data Sources

The major alternative source of county-area population estimates that should be considered by ORS for use in the entitlement periods remaining

under provisions of the present Act is the Bureau of Census work with Internal Revenue Service data for taxable years 1969 and 1972. If population estimates from this source are ready by February 1975, then they should be considered for use by ORS in calculating EP 6 allocations. If they are not ready, or cannot be confirmed as better estimates, then the 1973 county-area population estimates from the Federal-State Cooperative Program for Population Estimates, Series P-26, provides population estimates whose accuracy is rated as very good for counties with over 50,000 persons, good for the counties with between 5,000 and 50,000 persons, and fair for the rest. Since most of the nation's population is concentrated in those 500-odd counties with populations over 50,000 the overall accuracy of these data is rated as very good. The provisional estimates of 1973 county-area populations will be available by late 1974. Although the data would be two years old if used in EP 6 calculations, and therefore would rate only good in currency, no other Federal series now available approximates this currency rating for county-area level population estimates.

Although nearly all of the national income may be accounted for in the method under development (the Census model or the Administrative Records Program), assigning it to places based on any set of assumptions involves risk. The Bureau of the Census is well aware of these problems and the risks involved in making assumptions about the unknown flow of money and people. Until their ongoing tests are completed at the close of 1974, and the performance standards of the assumptions are fully tested, any final judgment of this alternative source of money income must be held in abeyance.

Two other sources of money income were also evaluated. The Bureau of the Census employed BEA data to compute a version of 1971 money income based on their own ratios of different kinds of incomes received in 1969. The Bureau used these data to compute county-area per capita income, with

population estimates from the P-26 Series. The BEA has constructed its own version of money income using disaggregated and reconstructed BEA data. No determination is possible as to which is a more accurate version. Both are nearly the same conceptually, and both could improve the currency of the present data by 5 years if the provisional 1974 figures could be rushed to completion, or if ORS delayed its deadlines for use in EP 6.

County-area adjusted taxes data, the summation of local government data, probably need improvement in accuracy, but there is no alternative data source that can perform this task. State governments are taking increasing responsibility for collecting and reporting these to the Bureau of the Census. Nine states took over this task for FY 1974 and nine more will participate for FY 1975. While this trend needs to continue and be encouraged, the precanvassing instructions and the review, editing, and validation procedures for the forms need to be strengthened. Whether performed by State or Federal officials, during follow-up visits or training courses, some form of education would probably help those officials who have difficulty understanding which of their tax and revenue items quality as (or correspond to) the items sought by the Bureau.

## Problems with Present Local-Government Data

Most of the conclusions about local-government demographic, economic, and taxation data quality parallel those of county-area level conclusions. The parallel occurs principally because there is no correspondence between the level of government in the allocation formula and the size of that government unit's population. Some cities have five times the populations of some States, and county populations in one State vary from 448 persons to over 7 million persons, while some municipalities are a thousand times the size of other municipalities. Except for a general

rule that most States have larger populations than nearly all cities, the accuracy of data, dependent as the data are on population size, cannot be evaluated strictly by level of government in the general revenue sharing formula.

Currency problems of local government data are exactly the same as those of the county-area data. The most serious currency defects are with the 5-year-old money and aggregate income, and 4-year-old population data. Once again, the currency of these elements needs immediate attention and remedy.

The accuracy of population may be no worse than that at a county-area level, but the accuracy of money income figures at the local government level probably has always been poor. The smaller size of the 20 percent sample has caused the Bureau of the Census to refrain from publishing per capita income figures for places with fewer than 2,500 persons. When ORS requested per capita income data on these places, the information had instances of zero and negative per capita incomes. It was for this reason that ORS assigned the mean per capita income of the county to places under 500 persons. Even for places with larger populations, the accuracy of money income needs attention.

Data on adjusted taxes and transfers, while as current as at the county-area level, are probably substantially less accurate. Because of the problems discussed in the conclusions on the two higher levels of government, the potential for lack of understanding or concurrence within 39,000 units of government is quite high. These taxation data also demand immediate attention paid to their accuracy.

At the local government level, there are some problems with the method by which data are handled for boundary changes, incorporations, and disincorporations. The regulatory requirements on government sizes need amending to be equitable to smaller units of government that annex,

and the entire system of collecting information on boundary changes, incorporations, and disincorporations needs to be changed to emphasize self-initiated, administratively useful data, with less reliance on an annual survey for general statistical purposes.

## Alternative Local Government Data Sources

The Census program using administrative records from the IRS and other sources is the only alternative data source for population and per capita income data at the subcounty level. The error due to bias inherent in any assumptions, or variance due to measurement techniques for county-area populations and money incomes, will be heightened in subcounty figures. However, currency for the data will be vastly improved. If evaluation tests are forthcoming by the end of this year, 1973 subcounty demographic and economic data could be ready for use by ORS in early 1975.

The methods recommended for improving the accuracy of taxation data discussed for the county-area level apply to the subcounty area. Although the recommended process may be costly initially, local controllers may need no more than one-time assistance. Such technical assistance at the subcounty level may have a valuable future payoff.

## Conclusions Regarding Technical Findings

The data change, sensitivity, and impact analyses performed during the GRS Data Study show that the real situation is changing dramatically, that the allocation amounts are sensitive to data errors and to these changes, and that these factors have an impact on the equity of allocations. Major conclusions pertinent to the evaluation of current and alternative data plans are summarized below.

Data Change Analysis

The data change analysis concluded that all data elements have a propensity to change and that differential rates of change can be expected among the 51 States, among county-areas within each State, and among local governments within each county-area. If the actual demographic, economic, and taxation characteristics of a recipient change but the data used to calculate their allocation do not reflect these changes, inequities will result, from the differential data change or error rates among competing units. The average (or constant percentage) annual cumulative change and its standard deviation were estimated for each data element. In addition, the maximum differential (or spread) between the lowest rate and the highest rate expected among States, among county-areas, and among local governments was determined.

The data quality evaluation of Volume III established a currency rating of "poor" for all data elements that have not been updated since the 1970 Census--per capita income at all levels, urbanized population, and substate population. The maximum differentials for per capita income suggest that differences among competing units in EP 5 could be as high as 28 percent at the State level, 46 percent at the county-area level, and 54 percent at the local government level, simply because the data are five years old. Although the relatively low standard deviation found for per capita income data suggests that most differentials among most recipients are much less significant, differences appear to be present for this data element at all levels. The State-area urbanized population and substate population data elements are also likely to contain significant differential timeliness errors under the present data plan for similar reasons. The only remedy under the current Act is to increase the frequency of data collection for these data elements.

Sensitivity Analysis

The sensitivity of the GRS allocation procedure to low quality data--whether caused by measurment errors at the time of collection or timeliness errors induced by data change since collection--varies by data element and level. The effect on allocations is usually not obvious and requires analysis.

At the State level, the principal conclusions are

- Errors or changes of a constant percentage in any data element do not affect the allocations.
- The order of importance, given equal propensity for error or change, of State-level data elements is: population, State and local taxes, per capita income, BEA income, urbanized population, State individual income taxes, and Federal individual income tax liabilities.

At the county-area and local government level, the main results are these:

- Allocations are almost completely insensitive to biases or errors that can be expressed as a constant percentage error or change throughout all units of government. (Taxes and intergovernmental transfers are exceptions when they affect 50-percent constrained units.)
- Updating county-area population without updating local-unit population would adversely affect constrained townships or places and Indian tribes and Alaskan native villages.
- Updating per capita income at the county-area level would be likely to improve overall allocations even though some units could be adversely affected. Units with populations below 500 must not have their per capita income set to the updated per capita income value of the county-area, unless comparable adjustments are made to all competing units.
- When local government and county-area taxes or per capita income are updated, allocation changes depend on changes in the local data relative to aggregate changes in the data throughout the State.
- Indian tribes and Alaskan native villages are sensitive to change in population for the unit compared with: population of the county-area if the county-area is unconstrained, the aggregate population of all county-areas if the county-area is constrained.

Impact Analysis

The equity and impact analyses conducted for interstate allocations support several general conclusions, although not all are recommended for implementation:

- The use of alternative data sources that improve the currency of data will increase the equity of allocations. Year-to-year variations will increase, however, for most recipients.
- Errors in timeliness cause more inequity than errors in accuracy. In addition, correcting for errors in accuracy without correcting for errors in timeliness may increase inequity above current levels.
- If present trends continue, inequity will tend to increase over the next 5 years as a consequence of the current data plan.

Various special analyses produced these additional conclusions.

- A significant increase in equity of allocations at the State level can be realized through:
  - Increases in accuracy and currency of per capita income
  - Increases in currency of the general tax effort factor
  - Increases in currency of urbanized population
  - Increases in accuracy (or adjustment of underenumeration) of population (this data element is already current).

  Most of the increased equity is attributed to increased currency of the per capita income data element. It should be noted that no alternative data source was found for urbanized population, suggesting that increased currency cannot be attained.

- A significant increase in equity of allocations at the county-area level can be realized through:
  - Increases in accuracy of adjusted taxes
  - Increases in the accuracy and currency of per capita income
  - Increases in the accuracy (or adjustments for underenumeration) and currency of population data (increases in equity are attributed primarily to increases in currency).

Once again, most gains in equity are attributable to gains in currency. County-areas, however, are not governments and to update the county-area population without updating population for local government units creates inequities.

- Some increases in equity of allocations to local governments can be realized through:
  - Increases in currency of 3 or more years for per capita income if the additional measurement error introduced is less than 7.5 percent.
  - Increases in currency of 3 or more years for population data if the additional measurement error introduced is less than 3.75 percent.
  - Increases in accuracy of data on taxes and transfers.

If the Bureau of the Census population and PCI model develops data that are more reliable than the data used in the special applications studies, more equity could be expected. These analyses, reported in detail in Volume IV, provide evidence that the current plan generates inequities at all recipient levels. They also indicate that at the State and county-area levels, errors of timeliness are generally relatively more important than errors of accuracy in untimely data. At the local government level, the results indicate that if the intercensal estimation error exceeds the sampling error and exceeds the reduction in error that result from using old data, then using the estimates will adversely affect equity. Consequently, any plan for updating the data elements for local governments must be examined to see whether or not it would produce desirable results, especially for small places.

## Conclusions Regarding Current and Alternative Data Plans

The use of alternative data sources to replace low-quality sources in the current plan will increase the equity of allocations. The equity of the allocations may be viewed from two points of view:

- Each recipient government can be weighted by the amount of revenue sharing funds it receives. Units of government that have a large population and provide many services would be weighted more heavily.
- Each recipient government can be weighted equally, no matter what its size or services provided.

Data strategies that appear desirable from one point of view may not necessarily prove desirable from the other; therefore, some compromise between the two will have to be made.

The sensitivity analysis found several relationships among levels of government in the allocation procedure. The most notable is the importance of the county-area population data in the computation of local government allocations. County-area population enters the local government allocations as follows:

- It is used to compute the proportion of the county-area allocation that goes to Indian tribes and Alaskan native villages.
- The sum of the county-area populations within a State is used to compute the per capita local share that is used in applying the 20 percent and 145 percent constraints to county areas, townships, cities, and places.

Any alternative that affects the county-area population estimates, then, must be accompanied either by an alternative for subcounty population estimates, or by some procedure that corrects for the inherent inequities that would result if the subcounty population estimates were not changed in a manner consistent with the changes in the county-area data. Short-range alternatives at the State, County, and local government levels are examined both on their individual merits and in relationship to the emerging data-strategy as a whole.

State Area Alternatives

The population estimates currently used in State-area allocation procedure were rated as excellent in terms of currency and very good in terms of accuracy. The known potential sources of error for this series include: use of provisional rather than revised estimates; the estimation procedure; bias in the 1970 baseline data due to underenumeration. The bias due to underenumeration is the only source of inaccuracy that has the potential of being reduced in the short term.

The procedure proposed for deriving adjusted population estimates in Volumes II and III will necessarily introduce some errors while correcting for others. This will result from violations of the assumption that the underenumeration rate for any particular age/race/sex category will be constant across States, and from the errors that exist in the rates of underenumeration. It is SRI's judgment, however, that on balance, the accuracy of the State-area population estimates would be improved as a result of this procedure. Although it was not possible to prove that increased equity would result, the reduction of biases due to underenumeration at the State level is viewed as a positive step by SRI. The research under way at the Bureau of the Census to improve the procedures for the 1980 Census and to develop underenumeration rates for the 1970 Census below the national level should be given a higher priority and should be granted increased resources by the Bureau and increased funding by Congress.

No feasible short-term alternative was found to improve either the accuracy or currency of urbanized population data. Techniques to improve this data element in the short term are either too simple to deal adequately with the complex concept of an urbanized area, or are too costly to warrant serious consideration for the short range.

The per capita income estimates had the lowest rating on accuracy and currency of all data elements at the State level. In the short term, the Bureau of the Census model will provide estimates that will increase currency without a major sacrifice of accuracy.

It is expected that the State-level income data will be available for ORS use prior to the February 1975 mailing of data slips to eligible GRS recipients as part of the data improvement program. (The alternative, using BEA money income estimates in conjunction with the population estimates from Series P-25, could be considered if the data from the Bureau of the Census are not available, but only if certain known problems in the BEA data, such as adjustment for place of residence for certain States, can be solved.)

A technique to adjust per capita income for underenumeration that could be implemented in the short range would use estimates of 1969 per capita income by race and sex and estimates of the number of uncounted persons by race and sex. (See Volumes II and III.)

For the short range, no further improvements in the accuracy of the per capita income estimates are foreseen. The Bureau of the Census is urged to continue its work in obtaining estimates of the extent of underreporting of income, and in developing techniques for adjusting income estimates for underreporting. Also, studies should be initiated to investigate the accuracy of reporting of farm income and ways of improving estimates of this income component.

Alternatives for State and local taxes and personal income data were examined together because the Act specifies that the currency of these two data elements must be the same. The importance of updating State and local taxes can be seen from the fact that the element enters both the three-factor formula and the five-factor formula; the general tax effort amount in the five-factor formula has State and local taxes squared

in the numerator; and finally, State and local taxes has one of the more volatile differential rates of change. The revised estimates of personal income available from BEA should be used in the allocation procedure rather than the provisional estimates now employed. The currency of the State and local tax data can be increased by the Bureau of the Census by increasing systems responsiveness, primarily through speeding up their survey of special districts. The benefits of increased timeliness in this data element merit the effort required for implementation. State individual income tax collections and Federal individual income tax liabilities enter the computation of the income tax amount used in the five-factor formula. The ratings for both elements on currency and accuracy were either very good or excellent. No alternative sources or procedures are offered for these data elements.

County-Area Alternatives

Once the highest feasible degree of equity of interstate allocations has been achieved, the next step is to achieve the highest feasible degree of equity of allocations to the 3,136 county-areas within the 50 States. (Since the allocation to substate levels is the same as to the State-area in the District of Columbia, D.C. drops out of the analysis at this point.) It must be stressed that any inequities in county-area allocations are passed on to all of the units of local government within the county-area.

County-area population estimates are inextricably related to the allocations made to townships and places that are subject to the 20 percent and 145 percent constraint, and to allocations made to Indian tribes and Alaskan native villages. Therefore, recommended alternatives at one level must be accompanied by corresponding alternatives at the other level; at the least, some procedural changes will need to be made to moderate inequitable side effects.

Two sets of 1973 county-area population estimates will be available to the Office of Revenue Sharing in time to be used in the EP 6 allocations. Both series of data are being generated by the Bureau of the Census (although they will issue only the most accurate).

- Estimates from the Administrative Records Program (Census model) that use Internal Revenue Service data to estimate migration patterns.
- Estimates from the Federal-State Cooperative Program.

These two series will not be generated totally independently, since the data from the Federal-State Cooperative Program will be used to check the estimates from the Administrative Records Program, and indeed, may be merged with preliminary estimates from the Administrative Records Program to yield the final results.

The county population estimates from the Administrative Records Program, then, would appear to be the better candidate at this time, since they incorporate the data from the Federal-State Cooperative Program with other estimates generated from IRS files. Furthermore, the Administrative Records Program will yield 1973 population estimates for all townships and places eligible for General Revenue Sharing. The currency of these estimates will definitely be preferable to the current data source--the 1970 Census. Updating the data to 1973 will reduce timeliness errors by 3 years. The accuracy of the estimates from the Federal-State Cooperative Program was rated as very good, indicating that the increase in currency would require a minimal sacrifice of accuracy.

Nevertheless, the decision to incorporate 1973 county population estimates must be deferred until the Bureau of the Census has definitive results concerning the accurary of the population estimates for townships and places. If the subcounty data are unacceptable to ORS because accuracy is too low, then an acceptable procedural compromise will be necessary if the updated county-area data are to be employed in the

allocation process to maintain equitable allocations to places, townships, and Indian tribes and Alaskan native villages.

The adjustment for underenumeration at the county level would generate negligible changes in equity, on the average. Furthermore, the assumption that the national underenumeration rates for the 96 age, race, and sex categories apply uniformly across all county-areas is difficult to defend. Even an unjustified attempt to adjust for underenumeration effects in the 1970 Census data is considered by some to be better than no attempt at all. However, from an overall point of view, considering all units of government, the increase in equity is questionable. Additional research is needed before underenumeration rates can be accurately portrayed at the local level. The Bureau of the Census and other organizations are urged to continue and accelerate this research.

Again, the only feasible alternative source for per capita income data at the county level for EP 6 and EP 7 is the Bureau of the Census Administrative Record program (Census model). If the income estimates for the county-areas are found to be of acceptable accuracy, but the updated estimates for townships or places are not updated, some inequities may result. These inequities would occur in a county that had a relatively high increase in per capita income overall, but where there were pockets of townships or places where the increase in per capita income did not maintain the county pace. No procedural technique was found to correct for these factors; however, it is anticipated that the overall increase in equity resulting from using the more current per capita income estimates would more than compensate.

The adjusted tax data at the county-area level was given a rating of good on accuracy and excellent on currency. Since the adjusted taxes for a county-area consists of the sum of adjusted taxes of all units of

local government within the county-area, alternatives for this data element will be discussed under local government alternatives.

Local Government Alternatives

As previously emphasized, equitable distributions of funds to State-areas and county-areas are necessary, but not necessarily sufficient, conditions for achievement of data-based equity of allocations to local governments. About two-thirds of the total allocation is disbursed to local governments, so that the accuracy and currency of the data at the local level are essential for an equitable disbursement of revenue sharing funds.

The 1970 population estimates that are currently being used for the population of Indian tribes and Alaskan native villages were generated by the Bureau of Indian Affairs using data from a survey of BIA administrative offices, data from administrative records, and data from the 1970 Census. The currency and accuracy of these data could be improved over the short range by developing estimates from BIA school enrollment data. In the absence of an enumeration effort, the technique described in Volume III, developed by BIA for estimates of population for the Navaho Nation, would appear to generate estimates that are at least as accurate as those now in use, with the potential to increase currency. The technique could be used either to refine the 1970 estimates or to generate 1973 estimates if 1973 county population estimates are used in the allocations. (The Bureau of the Census is now evaluating the BIA technique at the request of ORS. If this analysis indicates that decreases in accuracy outweigh increases in currency, then the BIA technique should probably not be used until necessary refinements are made.)

The only short-range alternative source for population data for places and townships is the Administrative Records Program of the Bureau

of the Census (the Census model). Estimates of 1973 population for all places and townships should be available by December 1974 for use in the EP 6 allocations. This will increase the currency of this data element by 3 years. If the improvements in currency can be accomplished without an overwhelming decrease in accuracy, then the data from this alternative should definitely be used by ORS in preference to the 1970 Census data.

Again, the only short-range alternative source for per capita income for places and townships is the Administrative Records Program of the Bureau of the Census (the population/PCI model, or the Census model). Considering the rating of the currently used data from the 1970 Census, the use of these data in EP 6 allocations is strongly recommended unless the test results, which will be available in December, indicate a substantial decrease in accuracy. It is anticipated that the use of these data in EP 6 will increase the equity of allocations to most townships and places with a population over 10,000. The probable impact on equity for small places is unknown. However, it is anticipated that the one-time shift in the level of allocations between EP 5 and EP 6 may be very large for a large number of places and townships of small to moderate size. For very small places, an alternative which is explicitly permitted in the Act allows the allocation of funds to towns and places with a population of fewer than 500 on the basis of population alone. This alternative is strongly recommended for consideration since, not only may there be errors in the per capita income data, but also there are serious questions concerning the accuracy of the adjusted tax data for the smaller units of government (although taxes and transfers would still be used for the 50 percent constraint).

The data on adjusted taxes and intergovernmental transfers have a currency rating of excellent and an accuracy rating of fair. This accuracy rating reflects potential inaccuracies of respondents to the GRS Survey resulting from misunderstanding or ignoring the accompanying

instructions. This study has neither assessed the magnitude of the resulting inaccuracies nor their sources due to lack of comparative data. It is recommended that the Bureau of the Census continue to improve edit and follow-up procedures to increase the accuracy of the data from the GRS Survey, especially for smaller units of government.

## Costs and Benefits

Every effort must be made to achieve the highest degree of equity at the State level because allocations at this level directly impact the equity of allocations to all units of government within the State. Implementation of such alternatives as were discussed above would result in very substantial benefits. The increase in equity that would accompany the implementation of the recommended alternatives at the State level merits their serious consideration for inclusion in an alternative strategy. The cost of implementing State-level alternatives are minimal, with the exception of the population/PCI model. The adjustments of population estimates for underenumeration require data that are readily available from the Bureau of the Census. The Bureau of the Census could develop the details of the procedure and the computer programs with a relatively small investment of time and money.

The full cost of developing valid underenumeration adjustments for each State-area, estimated at $500,000, need not be invested immediately, since there will be an improvement in data accuracy in EP 6 if the national rates of underenumeration by age, sex, and race are applied to State population figures from the 1970 Census. Funds to cover the cost of improving the data for State and local taxes, estimated at $100,000 per year, may not be available for EP 6, since the Federal fiscal year budget has already been adopted. However, perhaps some procedural changes could be adopted at little cost that would assist in speeding up the responses to the survey of special taxation districts.

If the Bureau of the Census population and PCI model fulfills its promise, current and comprehensive demographic and economic data will become available for use in calculating intrastate allocations. Although increased accuracy in the collection of taxation data is needed, the major increase in equity of allocations to local governments is attributable to increased currency of population and per capita income data. Potential benefits to local jurisdictions are dependent on the Bureau of the Census Administrative Records Progarm and related IRS and BEA activities. As of July 1, 1974, over $12 million had been invested in the development of the model. The FY 1975 development and operating costs are estimated to be $4 million. Although these costs are significant, so are potential gains in equity of allocations to local jurisdictions. And even if the $4 million figure is indicative of future annual operating costs, this is less than 0.1 percent of the over $6 billion distributed in a typical year. The fact that other Federal programs can benefit as well from intercensal demographic and economic data estimates suggests that this program should be continued and that additional resources should be committed if needed to increase the reliability of the data produced by the model.

Improvements in the accuracy of taxation data, including the addition of Indian tribes and Alaskan native villages to the annual GRS Survey, are estimated to cost $1.3 million annually. Although benefits in terms of increased equity are not so dramatic as those expected from more timely demographic and economic data, SRI urges that these improvements be made. In addition, the formal self-reporting system for boundary and annexation changes, at an annual estimated cost of $200,000, is felt justifiable by SRI, and this technique should be seriously considered by ORS and the Bureau of the Census for all local jurisdictions.

The State and Local Fiscal Assistance Act will distribute $30.2 billion to over 39,000 recipients between January 1972 and December 1976. The benefits to be gained from use of accurate, timely data more than justify the relatively modest expenditures needed to improve the quality of the data now in use.

## III MAJOR RECOMMENDATIONS

### Short-Range Recommendations

The GRS Data Study has shown that only a few alternatives exist for achieving increased equity of allocations through improved data quality under the current Act. The alternatives that are recommended by SRI for implementation by February 1975 (i.e., prior to EP 6) are largely complementary and mutually supportive. The most promising alternatives, taken together, constitute the data strategy recommended by SRI to the Secretary and to the Office of Revenue Sharing for short-range use. The strategy recommended below is consistent with the legislative provisions of the present Act and achieves increased equity, primarily through use of more timely data.

The following actions are recommended to increase the equity of GRS allocations to the 51 States (including the District of Columbia):

- Population--Inflate the most recent P-25 Series population data for each of the 51 State-areas to adjust for underenumeration. Use the 96 national age, sex, and race underenumeration percentages established for the 1970 Census, in conjunction with comparable demographic data for each State, to derive the percentage adjustment for each State. If possible, use the underenumeration rate established for Negroes in the 1970 Census to adjust for underenumeration of persons of Spanish origin in each State, as described in Appendix D of Volume III.
- Per capita income--Use the State-area per capita income estimates produced by the Bureau of the Census population and PCI model. These data, which are expected to be available by December 1974, will have a reference date of April 1, 1973, thus increasing the currency of the 1970 Census figures by 3 years for EP 6. Adjust the updated per capita income estimate for each State and the District of Columbia by assigning the

average per capita income value for each race to the population added when the underenumeration adjustment is made. The demographic inflation technique is described in Volume III. (If the Bureau of the Census model does not yield acceptable State-area per capita income data by December 1974, then the BEA estimates are recommended for use in developing State per capita income estimates.)

- General tax effort factor--Speed up the collection and processing of State and local taxes data from special districts to allow fiscal year 1973-74 data to be used for EP 6 along with calendar year 1973 personal income data. This would yield an increase in currency of one year over the present data plan. Even if such an acceleration cannot be made, revised rather than provisional BEA personal income estimates should be employed in this factor.

The adoption of these recommendations will make interstate allocations more equitable in EP 6 and EP 7. No short-range recommendations are feasible for urbanized population or State individual income taxes, and none are needed for Federal individual income tax liabilities.

The following actions are recommended to increase the equity of GRS allocations to the approximately 39,000 local governments (including Indian tribes and Alaskan native villages, county governments, townships, cities, and places):*

- Population--Use the substate population estimates produced by the Bureau of the Census population and PCI model for county-areas, townships, cities, and places. These data, which are expected to be available by December 1974, will have a reference date of July 1, 1973, thus increasing the currency of the 1970 Census figures by 3 years for EP 6.

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*The Bureau of the Census plans to publish population and per capita income data that update the 1970 Census base by 3 years for all eligible revenue-sharing recipients. Current judgment suggests that these data will be better estimates of the present population and per capita income for State areas, county areas, and most local governments than those contained in the 1970 Census data base. Because these data will be significantly more current than, and just as comprehensive as, the 1970 data, they will be acceptable in terms of the Act for use in the GRS allocation procedure.

Update the population estimates for Indian tribes and Alaskan native villages to July 1, 1973 using the Bureau of Indian Affairs technique described in Appendix F to Volume III. If the population estimates yielded by the Bureau of the Census model or BIA are unacceptable for small places (or are unavailable), the county-area population should not be updated unless a combination of subcounty updates and procedural adjustments are made to maintain the equity of allocations to all units within each county-area. Also the Boundary and Annexation Survey should be converted to a process where individual jurisdictions indicate action directly with the Bureau of the Census under the supervision of State certification officers (see Volume III, Appendix B). Underenumeration adjustments below the State-area level are not recommended for EP 6 or EP 7.

- Per capita income--Use the substate per capita income estimates produced by the Bureau of the Census population and PCI model for county-areas as well as townships, cities, and places over 500 population (if the ranges of error are acceptable to Bureau of the Census and ORS). These data, expected to be available by December 1974, will have a reference date of April 1, 1973, thus increasing the currency of the 1970 Census estimates by 3 years for EP 6. Calculate allocations for jurisdictions under 500 population solely on the basis of population as provided for in the Act. If the per capita income estimates produced by the model are unacceptable for subcounty units, then update the county-area level only. Do not use the county PCI estimate for jurisdictions under 500 population unless comparable adjustments are made to all competing units. (SRI recommends taking advantage of the legislative provision that allows allocations to such jurisdictions to be calculated on the basis of population alone.)

- Adjusted taxes--Improve the systems and procedures associated with the GRS Survey administered annually by the Bureau of the Census to increase the accuracy of the taxation data for county-areas, county governments, townships, cities, and places (see Volume III). Increased technical assistance to smaller jurisdictions would appear to be particularly promising. Include Indian tribes and Alaskan native villages in the Survey and in the calculation of county-area adjusted taxes (see Volume III, Appendix F).

- Intergovernmental transfers--Improve the systems and procedures associated with the GRS Survey as above to increase the accuracy of transfer data for county governments, townships, cities, and places.

The adoption of these recommendations will increase the equity of allocations within States in EP 6 and EP 7, if the Bureau of the Census population and PCI model fulfills its promise. No feasible short-range recommendations for adjusting for underenumeration below the State level were found that would provide complete equity. A compromise procedure, based on use of the national underenumeration rates for jurisdictions over 50,000 in population and the average 2.5 percent rate for all other jurisdictions, could be developed as described in Appendix D to Volume III. Because of the number of assumptions that must be made, however, SRI recommends against such a compromise at this time. A satisfactory solution to this problem must await the mid-range time period.

The Secretary and the Office of Revenue Sharing are urged by SRI to implement the short-range data strategy presented above in close cooperation with the Bureau of the Census, BEA, IRS, BIA, and other responsible and concerned agencies. Should the present legislation be modified by Congress prior to EP 6 and EP 7, some of the recommendations presented below could merit consideration for the short-range time period.

The Mid-Range Data Strategy

The GRS Data Study has reported some major findings and conclusions that cannot be adequately responded to under the present Act or be implemented prior to EP 6 or EP 7. Three fundamental principles should be fully considered by Congress in any extension to general revenue sharing:

- Valid demographic, economic, and taxation factors--Any scheme that distributes money to units of government based on formulas or decision-making rationales that place reliance on indicators derived from data on each geopolitical jurisdiction must pay close attention to both the validity of the indicators and the reliability of the data used to generate the indicators. From the perspective of revenue sharing, as embodied in the Act, the following questions are relevant:

- Is population a valid indicator of size, and can reliable data be obtained or developed?
- Is per capita income a valid indicator of need, and can reliable data be obtained or developed?
- Is adjusted taxes a valid indicator of own effort to satisfy need, and are reliable data obtainable?

Questions of validity fall outside the scope of the GRS data Study. The goals of General Revenue Sharing and the validity of major factors are likely to be debated in Congress when extensions or modifications to the present Act are considered. Questions of data reliability, however, are within the scope of the study, as discussed below.

- Reliable demographic, economic, and taxation data--General Revenue Sharing provides for distribution of funds to over 39,000 jurisdictions that vary in size from the State of California down to the one-person Rancheria Cortina Indian tribe, also in California. Given that the validity of the population, relative income, and tax effort factors is sufficient, the major task is one of attaining reliable demographic, economic, and taxation data for each of the over 39,000 juridicistions. Unfortunately, the methods used for general statistical and national income account purposes specified in the Act, although adequate for purposes for which they were designed, are somewhat inadequate for computing revenue sharing allocations for small jurisdictions. This is especially true for the indicator of need--per capita income--where even a full-scale census is inadequate unless a large sample (over 20 percent) of households in small areas is obtained, and unless problems of underenumeration and misreporting can be dealt with adequately. This is costly and, in addition, will probably not be carried out until 1980. A strategy that does not require accurate and current data for small areas (especially income data) might prove the best course of action in future revenue-sharing legislation.
- Equity versus stability--The Congressional concepts of equity and stability implicit in the Act appear to work at cross purposes due to the fixed entitlement amounts and their distribution through a fixed series of formulas and constraints. Although the entitlement amount increases by 2.5 percent annually, the major dynamic influence in the GRS allocation procedure is the propensity of the data to change. Ideally, the data used in the procedure should change exactly as the

true situation in any jurisdiction changes. Although perfect data-based equity of allocations would result, the changes in period-to-period allocation amounts would create hardships for recipients losing money they had planned on receiving. The current plan is both somewhat inequitable and somewhat unstable, and although the alternative data plans evaluated will tend to increase equity--a positive result--they will also tend to increase year-to-year fluctuations--a negative result. The Act directs the Secretary to use the best data available. A strategy that does not require data-based equity (especially for small areas) will decrease the variation of of allocations.

In addition, the following recommendations are made for consideration by responsible and concerned agencies.

- National statistical and data standards--SRI recommends that the Statistical Policy Division of the Office of Management and Budget and the Social and Economic Statistics Administration develop national statistical and data standards, and encourage their use among Federal and State agencies. Both agencies, with Congressional support, should continue to emphasize and expand their efforts. The scope of such programs as the Federal-State Cooperative Program for Population Estimates should be expanded. Positive results are being obtained, and these could lead to significant nationwide advances prior to the 1980 Census of Population and Housing, especially for demographic data at the State and county-area levels. Finally, a nationwide census is the only known method of collecting accurate population data in small areas; however, the acquisition of accurate money income data for small places is prohibitively costly in a full census. This poses a dilemma if revenue sharing continues to adhere to a closed-solution formula and to data-based equity.

- Intercensal updating procedures--SRI recommends that the Bureau of the Census and BEA continue, and increase, research efforts to develop more reliable intercensal estimation procedures, and postcensal underenumeration adjustment procedures. The rate of change of demographic and economic variables over time, coupled with the assumption that many Federal programs will wish to track that change rate closely, indicate that intercensal updating techniques and more frequent censuses have become a necessity. If procedures for estimation of demographic and economic variables between censuses should

become so highly developed that accurate estimates could be expected, clearly a long interval between full-scale censuses could be tolerated. Even with a mid-decade census, however, procedures must be developed for providing reliable annual estimates of demographic and economic variables, and they must produce usable results at the lowest geopolitical level in which the Federal Government has some administrative or categorical interest.

- Indicator validity and data reliability--SRI recommends that the Congress and responsible organizations in the Executive branch prescribe (and realize) better compatability between major indicators--particularly indicators of need--and the data needed to support the indicators. Assuming that the Federal Government needs to have personal income, total money income, per capita income, or some similar data factor that will indicate need, a single definition should be adopted. Sociologists, economists, and planners have found fault with both BEA and Census definitions of per capita income. Possible measures should be reviewed and a unified, comprehensive definition developed that will indicate relative wealth or poverty. The Congress and organizations such as the National Science Foundation are urged to support increased research to develop more valid and more reliable indicators of need--indicators for which reliable data can be obtained.

Some of the problems associated with the acquisition and maintenance of accurate and current data cannot be resolved under the current Act. There is an inherent conflict between collecting data for general statistical purposes and collecting data to accurately reflect the current real-world situation in particular places, as there is a conflict between equity of allocations and allocations that do not fluctuate widely from one entitlement period to the next. Other problems, such as underenumeration, require that some alterations be made to the design of the decennial censuses and perhaps to the method of administration of the census procedure, and that intercensal estimating procedures be developed that will more closely reflect actual conditions as they change over time.

## The Long-Range Data Strategy

The most promising long-range solutions, which include the mid-range recommendations, center on the development of national data standards, and compatible Federal-State-local indicators. These, together with statewide data systems, advanced intercensal techniques, and other capabilities needed for revenue sharing and other data-based programs should be encouraged and supported by Congress and other agencies.

Future legislation should recognize the need for statistical data that can reliably support valid indicators while safeguarding the anonymity of individuals. The major data collection agency in such a scheme is the Bureau of the Census. Decennial censuses coupled with mid-decade censuses and intercensal estimating techniques can likely be made completely adequate for the 1980s and 1990s.

If revenue sharing is to continue in its present form, the 1980 Census should be designed and conducted to make the data usable for revenue-sharing purposes as well as for traditional purposes. The Bureau of the Census should continue its efforts to reduce income misreporting and bias, and underenumeration. The Bureau of the Census should be authorized sufficient funding so that sampling, questionnaires, aggregation, and other procedures can be designed to accommodate the needs of revenue sharing as well as general statistical needs. Also, the Census design should include anticipation of more frequency updating of the figures through mid-decade censuses and intercensal estimates.

The combined efforts of a large number of organizations and individuals are required to realize the full promise of revenue-sharing--equitable distributions to all eligible recipients based on their size, need, and their own efforts to satisfy their needs. The resources required to achieve this goal must be committed now if significant results are to be realized in the next decade. The need of Federal and State programs for reliable data justifies a significant investment of time and money.

Appendix A

INDIVIDUALS PARTICIPATING IN OR CONTACTED
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